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REVIEW OF THE WORK OF THE UNITED NATIONS SYSTEM AND SELECTED ORGANIZATIONS DEALING WITH INVESTMENT-RELATED TECHNOLOGY ISSUES

Report by the UNCTAD secretariat

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Chapter I

INTRODUCTORY OVERVIEW

A. Background

1. The Cartagena Commitment, at UNCTAD VIII, marked a new departure and provided new directions for UNCTAD's work in the field of technology.1/ It requested the Trade and Development Board to establish the Ad Hoc Working Group on the Interrelationship between Investment and Technology Transfer, which, at its first session in January 1993, adopted its work programme.2/ The present review of the activities of the United Nations system and selected organizations dealing with investment-related technology issues has been undertaken in response to a request made by the Ad Hoc Working Group at that session.3/

2. In May 1993, a sample of 84 organizations, including organizations within the United Nations system, intergovernmental and non-governmental organizations, and national organizations providing development assistance, were invited by the Secretary-General of UNCTAD to provide him with information and relevant material on their work on investment-related technology issues over the past two years and regarding activities planned for 1994-1995. The organizations were asked to provide a short description of their activities, covering both analytical and technical cooperation aspects, and giving information on issues, sectors and countries dealt with, as well as the main findings of their work. They were also asked to address the three issues with which the Ad Hoc Group is concerned, i.e., investment flows, transfer of technology and competitiveness, technological capability-building, and transfer and development of environmentally sound technologies.

3. Forty-three organizations replied to the Secretary-General's request.4/ The present chapter gives an introductory overview. It is followed by a chapter providing a synthesis of the respective organizations' activities with regard to investment-related technology issues, observing, as much as possible, a common scheme, and listing organizations in alphabetical order within the respective institutional breakdown.

B. Overview

4. This section presents an introductory overview of the activities being undertaken by the responding organizations, according to the three issues under consideration by the Ad Hoc Working Group: (a) investment flows, transfer of technology and competitiveness; (b) technological capability-building; and (c) transfer and development of environmentally sound technologies.

1. Investment flows, transfer of technology and competitiveness

5. Essential components of the activities reported on in the present review concern the interrelated issues of investment, technology and competitiveness. A large number of the activities deal with research and policy analysis concerning these issues, and with the collection of corresponding data and information. This type of activity includes the research carried out on global trends within the organizations' respective mandates (e.g., DESD and UNU); issues concerning the technology and growth-promoting impact of foreign investment; or the role of foreign direct investment (FDI) in the transfer of technology, linking it to local technological development opportunities (e.g., ECA). Other important issues relate to the overall promotion of foreign investment (e.g., UNIDO and ICC); the implications of new technologies for investment and competitiveness, for example, of advanced materials (e.g., ESCWA and OECD), or the employment implications of investment flows, new technologies and competitiveness (e.g., ILO). Analytical work is also being carried out with a view to identifying the new type of technology policies required to tackle present economic challenges, for example, regional policies for increasing competitiveness and assisting in the industrial restructuring process (e.g., ECLAC). In addition, the organizations participating in the

present review reported on various workshops and seminars organized for the discussion of the above issues.

6. Though not always totally distinct, another set of activities appears to involve more action - and of a technical assistance-oriented nature, also encompassing diverse advisory services activities and training. Such activities cover, for example, a wide spectrum of financing ventures, carried out by organizations such as the regional development banks or the World Bank, or by associations of development banks (e.g., ALIDE), with each organization endeavouring to respond to the demand of its constituency in keeping with its resource availabilities. Other important activities are assistance to countries in the identification of priority areas and the formulation of specific projects for investment and technology (e.g., FAO and PTA); the promotion of inter-enterprise partnerships such as between EC and ACP enterprises; the establishment of joint ventures at the bilateral level (e.g., national organizations providing development assistance); and the creation of partnerships and exchanges between universities and industrial enterprises (e.g., the EC). The setting up and operation of databases, for instance on FDI, including related legal instruments, for example in East European economies (e.g., the ECE), constitute significant activities in this field. Regional coordination functions, e.g., with respect to industrialization or intellectual property, play a central role in the work of SELA.

2. Technological capability-building

7. Most of the organizations reviewed are involved in technological capability-building in their respective areas of competence, through assessments, studies, research, seminars, workshops, projects and training activities. The significant effort made by each organization in its own field to develop technological capacities demonstrates the importance attached to this factor for strengthening the overall technological capability of developing countries.

8. The results of these activities and information relative to regions and individual economies are disseminated in seminars and workshops, e.g., by the United Nations regional commissions, specialized agencies, and special programmes, including UNEP, FAO, IFAD, ILO and WHO, which undertake activities designed to build up capabilities in specific areas such as crop and post-harvest management, aquaculture, disease prevention, engineering, data processing, electronics and environmentally sound technologies. Research work and activities concerning new and emerging technologies, e.g., biotechnologies, micro-electronics and new materials, are increasingly being undertaken by specialized institutions that support the creation of networks at regional, interregional and global levels. Specific dimensions and aspects of these technologies are emphasized by the sponsoring organizations.

9. Human resource development activities are a central component of technical cooperation. Activities include training at the country level, involving new and emerging specific technologies, among others. They also cover issues such as foreign investment-related technology, investment in privatization and technology assessment, in both the public and private sectors. ESCAP, FAO, ILO, UNEP, ASEAN and PTA pay particular attention to training activities, while, among funding institutions, the World Bank gives priority support to training and technical education. The Bank has also helped to set up institutions for financing technological development in a number of countries, and directly funds such development in health and agriculture as well as economic research on technology-related issues. Dissemination of knowledge forms the central thrust of UNESCO's work; recently the organization has concentrated its efforts on programmes to promote cooperation between universities and industry. ESCWA and ECLAC aim at strengthening R&D institutions and their linkages with the productive sector, in addition to improving the role of industrial development banks in transferring technology. The EC Framework Programme on Research and Technological Development and the Programme on Human Capital and Mobility include education, academic exchanges and research programmes in technology-related sectors. EC technological and R&D cooperation is extended to developing countries and countries in transition with regard to health, agriculture, and industry. Apart from

project financing, regional banks assign increasing importance to technical assistance, particularly in technical project design and supervision. The IsDB also supports technological capability-building in the region through job training, scholarship programmes, and information networks in science and technology.

3. Transfer and development of environmentally sound technologies

10. The transfer and development of environmentally sound technologies has recently been one of the outstanding issues in the intergovernmental debate within a number of international organizations. Their activities are supported by research and efforts to disseminate information concerning the development, transfer and application of these technologies. Comprehensive reports have recently been prepared by a number of governmental and non-governmental organizations, while UNIDO, UNEP and ESCAP operate databases with information of particular relevance. The United Nations Conference on Environment and Development (June 1992) played a major part in attracting international attention to this issue and was followed by a number of intergovernmental meetings, notably the first session of the Commission on Sustainable Development which launched a comprehensive work programme in this area.

11. The efforts of developing countries and countries in transition to achieve sustainable industrial development are aided by technical assistance and financial support from a large number of sources. Special technical assistance programmes in this area are being implemented by UNIDO, UNEP, FAO, United Nations regional commissions and OECD, with financial support from UNDP, the World Bank, European Community, Common Fund for Commodities, regional development banks and individual donors.

* * *

12. While the present review allowed for the identification of an impressive variety of forms that investment and technology-related activities take, it is understandably difficult to grasp how evenly spread these are, or how they relate to the needs and requirements of the developing countries or of countries in transition. What emerges from the information gathered in the preparation of the review is clearly that, in a rapidly changing world in which the pace of technological change is accelerating, the need to keep up with such change, responding to increasing development needs and participating effectively in world trade require important and constantly renewed efforts on the part of the main economic actors in the field of investment and technology, such as governments, enterprises, financing institutions and the R&D community. Human resource development and the systematic search for novel and renewed forms of cooperation are key elements in these endeavours.

Chapter II

ACTIVITIES OF SELECTED ORGANIZATIONS DEALING WITH INVESTMENT-RELATED TECHNOLOGY ISSUES

13. This chapter presents a synthesis of the replies and the material received from selected organizations on the relevant work in the area of investment and technology. It is organized around the subjects of investment flows, transfer of technology and competitiveness; technological capability-building; and transfer and development of environmentally sound technologies.

A. Organizations of the United Nations system

1. United Nations organizations and bodies

(a) Department of Economic and Social Development (DESD)5/

(i) Programme on Transnational Corporations

14. The Programme on Transnational Corporations dealt with the activities of transnational corporations and their effect on a wide range of issues in the field of technology and investment.6/ The 1992 edition of the World Investment Report contained a chapter on transnational corporations, technology and growth which pointed out that the growth-promoting impact of technologies acquired through FDI ultimately depends upon the incentive structure faced by both foreign and domestic enterprises in developing and acquiring technologies. A study examining how transnational corporations from the developing countries can make a contribution to their home economies was recently published. The annual World Investment Directory publication provides analytical information on foreign direct investment flows and stocks. Numerous other publications of the Programme examine TNC activities, including technology-related aspects, from sectoral and country perspectives. Human resources development remained a central component in the Programme's technical cooperation activities. Advisory services and training activities provided training with significant emphasis on new technologies to entrepreneurs as well as to public officials of developing countries and of economies in transition.

15. In the field of environmentally sound technologies the Programme recently developed options to facilitate the transfer of these technologies to developing countries on favourable terms and undertook an extensive project on environmental accounting for sustainable development.

(ii) Science and Technology Branch (former United Nations Centre for Science and Technology for Development-UNCSTD)

16. Activities and publications of the UNCSTD (eventually Science and Technology Branch) have indirectly addressed the issue of interrelationship between investment and technology. The report on the contribution of technology to industrialization and regional and global integration, submitted to the Commission on Science and Technology for Development at its first session (April 1993), emphasized the need to integrate science and technology policies in developing countries in order to upgrade their scientific and technological base and strengthen the linkages between national research and development and private firms.

17. The Advanced Technology Assessment System (ATAS) was a tool for policy analysis and for strengthening the scientific and technological capacities of developing countries. The ATAS bulletins assessed a wide range of technologies, including microelectronics, automation, information, new materials, energy systems, photovoltaics and biotechnology. The ATAS programme addressed environmental issues in a publication on environmentally sound technology for sustainable development and in a study on energy systems, environment and development.7/ A recent report deals with energy technologies, focusing on policy issues and options for the effective transfer and application of environmentally sound energy technologies. In the area of

technological endogenous capacity-building, a number of reports have recently been prepared8/ and country projects implemented in Cape Verde, Jamaica, Pakistan, Togo, Thailand, Uganda and Viet Nam. Furthermore, a series of activities has been organized by the Science and Technology Branch in the area of conversion of industrial technology from military to civilian uses.

(iii) Mineral Resources Branch

18. A number of activities relating to technology and investment issues have been implemented by this Branch. A report on ways and means of facilitating the flow of financial resources and transfer of technology to develop the mineral resources of developing countries was presented to the Committee on Natural Resources at its first session, when a proposal was also made for a mechanism to gather and monitor information on the flow of investment in the mineral sector of developing countries, and capacity-building in investment promotion.9/ Many projects executed by the Mineral Resources Branch have financial-technical components in the context of investment promotion. For example, since 1989 a project has been assisting the Thai Government with the development of potash resources in North-east Thailand.

(b) Economic Commission for Africa (ECA)

19. ECA's work comprises various activities in the area of investment flows, transfer of technology and competitiveness. It has conducted case studies since the beginning of the 1990s on the role of FDI in transfer of technology, and on local technology development opportunities in African countries, covering information processing, food processing, petrochemicals, and negotiation techniques. In 1991, ECA presented a paper on the role of FDI in the transfer of technology through licensing agreements to a national seminar on transfer and development of technology in Burundi. In 1992, a case study in the United Republic of Tanzania on the role of transnational corporations (TNCs) in the transfer of biotechnology in Africa examined how governments could improve the mechanisms of transfer of biotechnology. A comprehensive study on FDI and manufactured exports from Africa is planned for 1994. Concerning technology capability-building, a current project on Japanese foreign investment in Africa emphasizes the development of human resources through TNC investment from Japan. ECA is preparing a study on the relationship between growth and technology transfer which will review issues and prospects involved. In the field of transfer and development of environmentally sound technologies, a case study on the transfer and development of new technologies in renewable energies in Burundi was recently published, examining the implications of TNC operations for technological development issues.10/

(c) Economic Commission for Europe (ECE)

20. Concerning investment and technology transfer, under the UN/ECE Committee on the Development of Trade, the ECE secretariat maintains a database on FDI in East European economies. A yearly survey of recent trends in foreign investment in European economies in transition was recently published. Within the framework of the Working Party on Contract Practices, the secretariat also monitors changes in legislation pertaining to FDI, including privatization legislation. A guide on selected legal questions related to these issues in the economies in transition was recently published, and the secretariat edits the"Newsletter East-West Investment News".11/

(d) Economic Commission for Latin America and the Caribbean (ECLAC)

21. ECLAC has been particularly involved in the area of investment and technology transfer through research and policy analysis, information gathering, and the organization of seminars and workshops. In research and policy analysis, the ECLAC/DESD Joint Unit on Transnational Corporations has paid special attention to the role of foreign capital in the process of restructuring under way in most countries of the region. Some of ECLAC's recent documents on the subject deal with industrial modernization, selected aspects of foreign capital and its impact on the industrial sector, the role of TNCs and the manufacturing sector, technological behaviour of national and

transnational enterprises, and industrial cooperation between developed and developing countries.12/ Most of ECLAC's material is based on case studies. With respect to information on FDI and TNCs in Latin America and the Caribbean, a restricted version of the Regional Statistical Directory was prepared. In 1992, the first regional symposium on TNCs for Investment and Development was organized.

22. ECLAC's Division of Production, Productivity and Management has analyzed the current situation and prospects of technology policies in Latin America, based on national experiences in the region, and is considering the policy issues to be tackled in the immediate future. These include the need for competition policies beyond trade liberalization, the identification of foreign investment, large domestic firms, strategic alliances as components of the Latin American agenda for technological development, and the importance of the regional and subregional integration framework for technological development.

(e) Economic and Social Commission for Asia and the Pacific (ESCAP)

23. Investment-related technology transfer issues have been receiving systematic attention from the Commission and other ESCAP legislative bodies. At its third meeting in October 1993, the Steering Group of ESCAP's Committee on Regional Economic Cooperation will, inter alia, deliberate upon a draft action programme for regional economic cooperation in investment-related technology transfer, and on the development of technological capabilities.

24. Concerning investment flows, transfer of technology and competitiveness, ESCAP has been promoting technology transfer to small and medium-size enterprises (SMEs). A Regional Investment Information and Promotion Service (RIIPS) is being considered to help enterprises, particularly SMEs, engage in industrial cooperation encouraging intraregional investment flows among capital- and technology-exporting and importing countries. Concerning legal policy aspects, the secretariat is finalizing a Regional Study on Patent Laws, Regulations and Organizational Structure. A project on promoting international competitiveness and efficient resource utilization in manufacturing is being carried out, and a seminar held in 1991 suggested that outward-looking and liberalization policies, cooperation in research and development and human resource development assisted in achieving manufacturing competitiveness. Concerning technology transfer policies, the secretariat undertook a regional study on the legal aspects of biotechnology transfer and convened a meeting in 1991 to assist in strengthening legal frameworks. At a workshop held in 1992, the establishment of an umbrella mechanism for regional cooperation in the interrelated areas of standardization, metrology, testing and quality control was envisaged. The creation of a technical consultancy development programme for the region, based on the concept of TCDC, is being considered, and the secretariat is planning a regional survey. Through the Asian and Pacific Centre for Transfer of Technology (APCTT), a system for providing quality information on technology opportunities to small and medium-scale industries, with emphasis on environmentally sound technologies (METI), and a regional on-line technology information service (APCTT OTIS) have been established.

25. In the domain of technological capability-building, ESCAP assists in industrial and technological policy formulation and reorientation relative to the least developed countries and economies in transition, such as the Asian Republics of the Commonwealth of Independent States (CIS). Policy seminars on private-sector growth, investment and technology were organized in Bangladesh and Nepal. A Seminar-cum-Study-Tour on Human Resources Development Policy and Planning for Industrial Development was held in November 1991. Other seminars on technology issues were organized in 1992 for Thailand and Malaysia, and a project on technology transfer and management for selected transitional economies was formulated. With respect to the transfer and development of environmentally sound technologies, courses were conducted within the Pacific Energy Development Programme from 1989 to 1991 in Kiribati, Solomon Islands, Maldives, Palau, Fiji, the Federated States of Micronesia and Papua New Guinea. The courses provided training and related materials on photovoltaic

systems for instructors at technical training institutions aimed at promoting technical progress and employment generation in the rural sector.

(f) Economic and Social Commission for Western Asia (ESCWA)

26. The activities of ESCWA's Science and Technology Programme in investment-related technology issues have both regional and national dimensions. Concerning investment flows, transfer of technology and competitiveness, ESCWA, in cooperation with UNIDO, IDRC and the Islamic Development Bank, recently held a workshop on the implications of new and advanced materials technologies for the economies of the ESCWA countries. Two workshop recommendations dealt respectively with resource and technological requirements for utilizing polymers, composites and ceramics, along with the decision to hold a workshop for officials in Egypt on policy implications of new and advanced technologies. The former activity has been included in ESCWA's work programme for 1994-1995. Currently, ESCWA is organizing a workshop on the integration of science and technology in development planning and management in the private and public sectors. With respect to technology capability-building, ESCWA carried out an extensive study on the strengthening of research and development and its linkages with the production sector. In 1989, ESCWA organized a workshop in cooperation with various national and regional institutions on the role of specialized financial institutions in the development of endogenous technological capabilities in the region.

27. Concerning the transfer and development of environmentally sound technologies, ESCWA has formulated a project proposal to establish a regional network of experts and institutions on technology assessment and forecasting in that field, including all the developed countries with which ESCWA countries have extensive trade and technology transactions. ESCWA's work programme covers activities concerning the protection of the ozone layer, including training courses for engineers, technicians and managers on the rationalization of the production and use of substances harmful to the ozone layer. A regional science and technology network is being established, with the cooperation of regional and national institutions, to survey government departments and NGOs concerned with science and technology for development.

(g) United Nations Development Programme (UNDP)

28. UNDP contributes financing to science and technology, and to mineral exploration projects as well as feasibility studies and geothermal energy through the Fund for Science and Technology (UNFSTD) and the Revolving Fund for Natural Resource Exploration (UNRFNRE). The overall UNDP-framework of capacity-building for human development focuses on national training programmes, assistance in policy formulation, and institution-building in the areas of environmental problems and natural resource management, management development, and the transfer and adaptation of technology.13/ UNDP also supports national programmes to promote partnership between the private and public sectors.

29. One of UNDP's instruments for the follow-up to UNCED is Capacity 21, a framework for national programmes that aims at capacity-building for managing the environment and natural resources in the context of economic and social development. The activities under the programme are intended to strengthen the decision-making process and to facilitate better access to information, greater awareness, knowledge and participation concerning the underlying issues. Launched in 1993, the programme is currently being implemented in 10 countries; for 1994, further activities are planned in another 15 to 20 countries. Within the Global Environment Facility (GEF), where UNDP participates as one of three implementing agencies, a comprehensive work programme has been developed for financing investment-related technologies which lead to reduced greenhouse gas emissions, conservation of biological diversity, cleaner international waters and conservation of the ozone layer. During the three-year pilot phase of the GEF (1991-1993), UNDP is managing a work programme of 55 GEF projects valued at US$242 million, including 23 global warming projects, 23 biodiversity projects, 8 international waters projects and one ozone-related project. In addition, UNDP is undertaking 19

pre-investment studies valued at US$17.6 million and a small grants programme now operational in 33 pilot countries.

(h) United Nations Environment Programme (UNEP)

30. UNEP's main activities in the field of investment-related technology issues concentrate on the transfer and development of environmentally sound technologies. Increasing emphasis is given to the implementation of Agenda 21, which provides a significant opportunity to integrate developmental and environmental considerations into a programme of specific projects to support sustainable development. The Earthwatch programme, coordinated by UNEP, is to play a significant role in the work of the Agenda's implementation by helping to identify emerging environmental problems, assess risks and issue early warnings. The programme is to expand its cooperation with private and non-governmental research institutes. UNEP's tasks include the dissemination of environmental information to governments and other bodies of the United Nations system through its cooperation with, inter alia, FAO, WHO, UNESCO, IUCN and OECD, coordinating scientific and research activities directed toward sustainable development issues.14/

31. The UNEP Governing Council places high priority on strengthening UNEP's contribution to science for the management of sustainable development. At its seventeenth session, it called for stronger measures to encourage technology transfer through UNEP's Industry and Environment Programme Activity Centre in France, and the recently established Environmental Technology Centre in Japan. The Centre in France provides a clearing house function through its "OzonAction" programme, while UNEP's Cleaner Production Programme facilitates the transfer of technologies and management tools that reduce emissions at the source and conserve raw materials and energy.

(i) United Nations University (UNU)

32. The UNU's Institute for New Technologies (INTECH) is a research and training centre devoted to the economic and social aspects of new technologies. It seeks to improve the understanding of the implications of new technologies for development strategies and industrialization policy, the influential factors in the diffusion of new technologies to developing countries, and the impacts of new technologies on socio-economic variables such as output, trade, employment and distribution of welfare. Besides research and advanced academic training, INTECH's tasks comprise information dissemination. While currently focusing principally on micro-electronics, INTECH intends to broaden the scope of its work during the 1994-1995 biennium, to cover the development role of biotechnology, the implications of new technologies for environmental quality and sustainable development, and the problems and opportunities presented by the combination of new technologies and institutional reforms in Eastern Europe. INTECH also intends to contribute to the work on the interrelationship between investment and technology transfer.

2. Specialized and related agencies

(a) Food and Agriculture Organization (FAO)

33. FAO has been operating country-level and regional field projects which have strong research, technology transfer and development components. In the field of transfer of technology, it is preparing a conceptual framework, guidelines and indicators relating to assessment and transfer of technologies for sustainable agricultural and rural development. With the support of UNDP, FAO is liaising with five international agricultural research centres of the Consultative Group on International Agricultural Research (CGIAR) for providing more complete information on the choice and application of mature/proven technologies at the global level. The Investment Centre has assisted selected member nations in formulating proposals for public investments in technology generation and transfer in agriculture and natural resource management, mainly to create or strengthen national R&D institutions. Proposals for private investment take the form of credit components to allow the introduction of more cost-effective technologies or systems of operation.

The FAO Commission on Plant Genetic Resources is considering a code of conduct for transfer, development and use of biotechnology in issues relating to intellectual property rights and bio-safety. Regional bio-informatics networks have been established in Asia, the Pacific, Latin America and the Caribbean. A recent publication entitled "Bio-technology in Agriculture, Forestry and Fisheries" set out policy guidelines for the development and use of biotechnologies.

34. In technology capability-building, policy assistance is being provided to member countries regarding technology choice, priority setting, linkage and application of new technologies. FAO is assisting in linking private and public sectors, especially as regards in vitro culture of virus-free planting material, with a view to strengthening cooperation among developed and developing countries in modern biotechnologies, and the development of human resources, research infrastructures and joint ventures through regional networks and programmes in Asia and the Pacific and Latin America and the Caribbean. FAO is also helping developing countries, especially in the Near East, to increase the role of universities in agricultural research and development. In addition, it is preparing a conceptual framework and guidelines for assessment and transfer of technologies for sustainable agricultural and rural development, intended for use by technology transferrers, developers, and farmers at the grass-roots level. Concerning the transfer and development of environmentally sound technologies, FAO has formulated projects for financing by the Common Fund for Commodities that involve the development of such technologies in specific processes, e.g., palm oil extraction. Activities promoting the use of natural fibres, jute and hard fibres as environmentally-friendly products are also supported.

(b) International Fund for Agricultural Development (IFAD)

35. IFAD supports research and development initiatives undertaken by other institutions, and has had substantial influence on efforts to address investment-related technology issues particularly through its grant financing for research undertaken by the international research community to generate technologies relevant to its target groups, and its support of investment projects for testing, adapting, and disseminating agricultural technologies in developing regions.

(c) International Labour Organization (ILO)

36. The activities of the ILO15/ concerning the employment implications of investment flows, new technologies and competitiveness relate to micro-electronics and information technologies as well as biotechnology and flexible specialization and global distribution of jobs. Results suggest that micro-electronics could play a key role in overcoming the North-South technological gap as the use of this technology is spreading with unprecedented speed to developing countries. A review of current and pipeline biotechnologies reveals both positive and negative socioeconomic features, i.e., small firms could benefit and rural employment be enhanced through multiple cropping and reduced costs of production, but the substitution of certain commodities exported by developing countries could create unemployment there. The shifts in the global distribution of employment resulting from the introduction of new technologies are currently being examined and appropriate investment and socio-economic policies elaborated.

37. Within ILO's perspective, technological capacity-building consists of three key elements: nurturing of individual skills, the assembling of individuals possessing those skills into effective groups, and the infusing of such skills with zeal and purpose. An ILO study of the secondary sector has revealed the role of non-governmental institutions to be no less important than that of governmental institutions and macroeconomic policy in the accumulation of technological capacity. With respect to transfer and development of environmentally sound technologies and employment, ILO's work demonstrates that some environmental conservation and management activities could be employment generating, and that in the course of economic development environmental degradation first increases and then begins to fall. ILO studies also suggest trade-offs and complementarities among environment, employment

and technological change. Ongoing and future work in this area will focus on the technology, poverty and environment interrelationship, assessment of the employment implications of environmental policies and programmes, and the operational interpretation of Agenda 21 concepts such as environmentally sound technologies and sustainable livelihoods.

(d) United Nations Educational, Scientific and Cultural Organization (UNESCO)

38. UNESCO's role is to strengthen all forms of educational activities, inter alia, by providing opportunities for retraining. Most of its activities relate to technological capability-building. With respect to programmes to stimulate technology transfer between higher technical institutions and local industries, the University/Industry Partnership in Africa (UNIPAR) assists countries, among other things, in adapting engineering education and training structures for effective technology transfer and industrialization. It will also contribute to encouraging universities and industries in developed countries to assist in the transfer and adaptation of environmentally-sound technologies to African countries. The International Fund for the Technological Development of Africa (ITFDA) is being set up to support the UNIPAR project. Under the University/Industry/Science partnership (UNISPAR) four major programmes are being developed (e.g., the Bolívar Programme and the Common Market of Knowledge (MECCO) in Latin America). UNESCO's Steering Committee on Human Resources Development for Technical Industry Stimulation aims at meeting the requirements of industry, and at identifying, designing and funding projects in which UNESCO can make a decisive contribution.

(e) United Nations Industrial Development Organization (UNIDO)

39. UNIDO activities foster investment and technology flows from industrialized to developing countries through a range of promotion and technical cooperation services of a sectoral and trans-sectoral nature. UNIDO's framework for investment-related technology transfer encompasses technology transfer through the mobilization of foreign investment resources, including financing for developing countries, the Industrial and Technological Information Bank (INTIB) and the twice-yearly technology markets (TECHMARTS) in different countries. Developing countries' technology acquisition and negotiation capabilities are enhanced through activities addressing governments, R&D institutions, enterprises and individuals. An information network on technology market and issues of technology transfer, adaptation, development and use links technology transfer agencies. This also promotes policies for technology transfer and cooperation. Advice is offered to governments and entrepreneurs through a Technology Advisory Service, and transfer of technology to small-and medium-scale enterprises is promoted through plant-level cooperation between enterprises in developed and developing countries and among developing countries. UNIDO is aimed at sensitizing policy makers to the impacts of new and emerging technologies, and stimulating the formulation of policies relative to advanced technology whose developments are reported in specialized newsletters and a Technology Trends series. UNIDO also promotes international and national centres of excellence and cooperation networks for advanced technologies, e.g., the Latin American Biotechnology Network, and arranges cooperation between R&D institutions in developed and developing countries to enhance the latter's knowledge and capacity to benefit from them. At the request of the ACC Task Force on Science and Technology, UNIDO is preparing a report on commercialization of biotechnology and intellectual property rights.

40. Through the promotion of international centres such as the International Centre for Genetic Engineering and Biotechnology and the International Centre for Science, it also contributes to the development and promotion of technologies of critical importance for developing countries. Other examples of UNIDO's technology transfer and cooperation activities are the International Rubber Research and Development Board and the Regional Network for Pesticides for Asia and the Pacific. The impact of TNCs on research is the subject of a number of studies and guidelines, and a technology transfer guide for research institutes to enhance commercialization of their work is under preparation.

41. UNIDO supports actions by countries to enhance their capacity through technical cooperation, particularly with respect to pilot plant projects. In the field of financial resource mobilization for technology transfer, UNIDO's Investment Promotion Service organizes fora for promoting investment projects, country presentation tours and an integrated software package for information on projects, sponsors and foreign partners. A new programme promotes build-operate-transfer (BOT) financing, and identifies alternative funding for investment and technology transfer.

42. Transfer and development of technologies of critical importance is the main focus of UNIDO technical cooperation services, which are organized in a sub-sectorial way to cover agro-based industries, chemicals, engineering industries and the metallurgical sector. These are closely linked with sub-programmes for industrial strategies and policies, institutional infrastructure, industrial management and rehabilitation, and industrial human resource development. UNIDO focuses on generic technologies as being of critical importance: information processing, telecommunications, new materials, new energy technologies, marine industrial technologies, genetic engineering and biotechnology. With respect to human resources development, UNIDO aims at building up capabilities in technology acquisition and negotiation, investment promotion (through "hands-on" experience for delegates to UNIDO investment promotion offices), and technology management.

43. Concerning the transfer and development of environmentally-sound technologies, UNIDO's technical cooperation addresses global environment issues covered under the Montreal Protocol, the transfer of end-of-pipe and of inherently clean, low-waste and low-energy technologies and the recycling of waste. Its advisory services assist in the relocation of polluting industries, reduction of hazardous wastes from pesticides and war, and the introduction of environmentally-sound industrial development strategies. An Environment and Energy Information System seeks to establish cost-effective mechanisms to manage environmental information required by small-and-medium scale industries. Focusing on long-term sustainable technological development, UNIDO proposes to complement a global programme with studies and technical cooperation to identify areas where the unique problems of the developing countries require changes in technological trajectories, and to take steps toward such changes.

(f) World Bank (WB)

44. The World Bank assists countries in technological capability-building through sector work and policy dialogue, sectoral projects, technical assistance and research. Its analyses of country problems and alternative ways of addressing them, taking into account technological considerations and capabilities, form the basis for specific projects that reflect the Bank's active role in technological capability-building. At the general level, this is embodied in the choice of technologies for the projects, the promotion of technology appropriate to the environment and the mobilization of local technological capacity. Concerning specific technology components, in agriculture for example, the Bank has financed research on seed varieties, irrigation and animal husbandry techniques. It has also financed research in industry, infrastructure and energy. The Bank has supported the development of sophisticated scientific and technological skills by funding technical institutes, universities and special programmes. It has also supported projects, primarily focusing on technology-related infrastructure, e.g., by financing technology dissemination and research institutions. In the industrial sector, it has created specialized institutions for financing technological development in Hungary, Israel, Republic of Korea, Mexico and Spain, and set up an electronics research facility in Korea, as well as a facility for standards and quality control in Turkey. It has also supported scientific education and research to assist the development of technical manpower in Brazil, China, Mexico and the Philippines.

45. World Bank's technical assistance and lending operations include feasibility studies, engineering design and construction, the supervision of projects, research and development, institution building, and training activities. The Bank is active in economic research and technology-related

issues such as technological capability acquisition, technology policy, foreign direct investment, intellectual property aspects, the impact of high technology on traditional industry, including computer industry policy and biotechnology potential for developing countries. It is also active in the development of technologies, for example through support to the Consultative Group on International Agricultural Research (CGIAR), and the WHO research programmes on tropical diseases and human reproduction. Concerning environmentally sound technologies, the Bank's activities include financing of pollution abatement projects as well as the transfer and development of environmentally sound technologies through industrial efficiency, and of alternative energy technology and efficient energy conservation techniques. In collaboration with UNDP and UNEP, it is implementing the Global Environment Facility which finances environment-related investments and technology development, generating global environmental benefits not otherwise possible under normal country lending operations.

(g) World Health Organization (WHO)

46. WHO activities concentrate mainly on endogenous technological capability-building. WHO considers technical cooperation among developing countries (TCDC) as one of the most appropriate tools for creating, adapting, and transferring knowledge and experience towards Health for All goals,16/ and, in recent years, it has supported the implementation of numerous TCDC projects. WHO has also supported joint international R&D projects, for example, on the rational use of drugs, malaria and schistosomiasis control techniques, simple, low-cost methods for testing water, food and air quality, and appropriate technology for water supply and sanitation. Other main activities, including support for technology-related projects, concern maternal and child health and family planning, control techniques for African trypanosomiasis and the Latin American Chagas disease, and monitoring and prevention of cardiovascular diseases. WHO is particularly aware of the impact of the environment on health conditions; it has launched special environmental health programmes concerning the management of natural resources for improving such conditions.

B. Intergovernmental organizations

(a) African Development Bank (ADB)

47. Concerning investment, science and technology-related issues, the African Development Bank's involvement is implicit in its lending operations through the various funding mechanisms it uses, in the form of grants and loans. The Bank lends to all sectors, public or private, notably agriculture, transport, public utilities, industry, health and education. The Bank's involvement in technology is articulated in its policy on Science and Technology for Development. All projects involve in various degrees the application and utilization of technology. Consequently, in the Bank's project preparation and appraisal, technology issues are reviewed to ensure that the technology adopted responds to the following basic criteria: (i) it is technically viable (and environmentally acceptable); (ii) it has proved its worth in field testing on a practical scale; (iii) it is backed by adequate after-sales servicing.

(b) Asian Development Bank (AsDB)

48. A number of AsDB's activities concern investment-related technology issues. In the field of investment flows and transfer of technology, the Bank approved in December 1991 a US$300,000 technical assistance grant for a regional study on technology transfer and development in its developing member countries (DMCs), aimed at promoting technology transfer and growth in four countries of the Asia-Pacific region - Bangladesh, China, Pakistan and the Philippines. Before finalization of the study, a regional seminar for consultants and policy makers will be held at the Asian Institute of Technology in 1993 to discuss a regional perspective for future assistance and reorientation of the Bank's approach so as to reflect the changing needs and priorities of its DMCs. Concerning technological capability-building, the Bank is currently financing a large project on Malaysia's industrial technology

development and management with emphasis on strengthening R&D capacity in the fields of automated manufacturing technology and advanced materials, on human resource development, and on enhancement of a science and technology information system. An industrial sector programme loan to Nepal aims to create a policy environment that will increase the sector's efficiency while realizing its growth potential on a sustainable basis.

(c) Association of South-East Asian Nations (ASEAN)

49. ASEAN covers various activities in relation to investment-related technology matters, stressing human resource development. Concerning investment flows, transfer of technology and competitiveness, a special joint programme by ASEAN and the United States includes a series of projects, the first of which is a six-year private investment and trade opportunities project to promote private-sector trade, investment and technology transfer among companies in the ASEAN region and the United States. It has an important technology services component aimed at promoting technology transfer, quality assurance and certification, standards development, and the development of new packaging and materials. It is also to serve as a clearing house. With respect to technological capability-building, in the 1980s ASEAN participated in the creation of specific technology centres dealing with forest management in cooperation with Canadian institutions, as well as timber production, industrialization, agricultural research and training. Concerning the transfer and development of environmentally sound technologies, ASEAN assists member countries in elaborating sustainable development strategies by promoting private-sector initiatives and strengthening local capabilities to address urban and industrial pollution, the issues of non-conventional energy research, sustainable exploitation of marine resources and solar energy. Within the context of ASEAN-US cooperation, environmentally sound technologies are central and include the development of assessment guidelines and technologies for ASEAN countries.

(d) Caribbean Development Bank (CDB)

50. The CDB contributes to the transfer of technology and to technological capability-building in its member countries, addressing in particular small and medium-sized enterprises through the Caribbean Technological Consultancy Services (CTCS) Network, which, since 1985, has been providing technical assistance in a practical form and through relevant documentation.17/ The Bank places emphasis on the environmental impact of its projects, as well as on human resource development, and will be making an in-depth study of these matters.

(e) Centre for the Development of Industry (CDI)

51. The CDI was created by the EC and ACP countries to foster small and medium-sized industrial enterprises in developing countries that were signatories of the Lomé Convention. Concerning investment and technology, and technological capability-building, CDI promotes partnerships between EC and ACP enterprises through joint ventures, and business partnerships through know-how, marketing, and management agreements. It also assists in marketing ACP manufactured products in the EC, and offers other services, including the facilitation of contacts between ACP entrepreneurs and European suppliers of technology, know-how and finance. CDI's assistance includes the selection of suitable plant and equipment, evaluation of technology, and training and technical assistance for start-up. Twenty-two investment projects involving technology transfer are concentrated in the agro-allied industries, building and construction, chemical and pharmaceutical industries, and mechanical engineering and metal industries.

(f) Commission of the European Communities (EC)

52. On the basis of a common strategy on technology, the European Community is active in various investment-related technology matters.18/ Successive Framework Programmes for Research and Technological Development have defined relevant aspects concerning research and technology policy, priorities and budget for research support for five-year periods. The EC's cooperation with

developing countries and countries in transition is financed separately and, with few exceptions, embraces programmes and projects outside the Framework. With respect to technological cooperation among member states in investment-related areas, the aim of the Framework Programmes is to strengthen the international competitiveness of European industry in high-technology sectors.19/ Technological capability-building activities figure importantly in the work of the EC, and many of them are supported by education and training programmes outside the Framework. The area of environment and of environmentally sound technologies, e.g., environmental protection and research, is assuming an increasingly prominent position in funding as compared to the 1980s.

53. Concerning cooperation with developing countries and countries in transition, the main EC programmes of cooperation in technology and investment are the activities of the Centre for the Development of Industry (CDI), the Science and Technology for Development Programme (STD), the International Scientific Cooperation Programme (ISC), and the European Community Investment Partners Scheme (ECIP), of which only the STD is financed under the Framework Programme. The following activities are being carried out or are in the planning stage: (i) with respect to technology transfer and competitiveness, the ECIP constitutes a financial instrument for investment promotion, facilitates in particular the licensing and joint ventures between local operators in Asia, Latin America, Mediterranean countries (ALA/MED) and their European counterparts, and serves as a vehicle for technology transfer. Within the framework of the Lomé Convention, the promotion of investment and cooperation between enterprises, which, inter alia, aims at technology transfer, includes three elements: the activities of the Centre for the Development of Industry (CDI), activities in the area of investment protection and guarantees, and the organization of regional industrial and sectoral conferences; (ii) concerning technological capacity-building, the Science and Technology for Development Programme (STD) operates partnerships between researchers and institutions in EC and ACP countries, and offers advanced training and cooperation in institutional development in the fields of health and agriculture. The International Scientific Cooperation Programme (ISC) encompasses joint research between centres in the EC and those in ALA/MED countries. The EUREKA project promotes cross-border cooperation in European research and technology, and is to complement Community research. LET'S GO EAST, still in the planning stage, is conceived as a short-term emergency programme for Eastern European countries. The programme is to support joint research projects to encourage transfer of technologies and know-how to Eastern Europe; to help evaluate R&D needs; to provide scientific and technical equipment, as well as fellowships for researchers and experts; to support joint scientific congresses and seminars; and to prepare future aid and cooperation programmes, such as EAST (European Assistance in Science and Technology); (iii) cooperation on environmental issues is increasing in importance.

(g) Consultative Group on International Agricultural Research (CGIAR)

54. CGIAR serves as a bridge between strategic research institutions in advanced countries and national research institutions in developing countries, with the aim of strengthening technological capability-building in agriculture-related areas. CGIAR work includes an important concern for environmentally sound technologies.20/ Its work is considered of particular importance for the sustainable conservation and use of plant genetic resources. CGIAR has adopted an "ecoregional" approach in order to focus and coordinate its research skills for sustainable production and conservation of natural resources. It currently works in partnership with research groups in various countries and regions, and at the international level. It is also developing a research model embracing the physical, biological and human dimensions of long-term sustainable agricultural production. Five CGIAR international research centres are working with the Food and Agriculture Organization (FAO) to provide detailed information on new technologies in order to assist countries in formulating policies for the choice and application of such technologies.

(h) European Investment Bank (EIB)21/

55. The EIB - the financial institution of the EC - finances projects all of which include technology elements whose nature is determined by countries' comparative advantages, industrial competitiveness, labour productivity, and environmental factors. With the establishment of the European Single Market in 1993, great importance has been attached to the financing of measures to help strengthen the international competitiveness of European enterprises, encouraging business competitiveness, research, and technology development. With respect to environmentally sound technologies EIB projects have included the areas of water, air, waste, and urban development. Concerning bank financing outside the EC in relation to technologies linked to these areas, EIB has cooperated with the EC Commission, the World Bank, UNDP, EBRD, and the Nordic Investment Bank in financing projects for environmental protection and sustainable development, e.g., the Mediterranean Environmental Technical Assistance Programme (METAP). In addition, an environmental rehabilitation initiative is planned for countries bordering the Baltic Sea, the Elbe and the Danube.

(i) Inter-American Development Bank (IDB)

56. Concerning investment-related technology matters, the IDB is providing technical cooperation funding and support to the Bolívar Programme, and has set up the Latin American Agency for Science and Business (ENLACE), now fully operational, for this purpose. The objectives are to promote linkages and technology transfer among enterprises in different countries of the region and between these and research and development institutions. It is also intended to stimulate the mobilization of financial resources, including those of bank operations, through the generation of technological development projects to be carried out by enterprises in the region with the possible participation of enterprises and/or research centres from other regions.22/

(j) International Centre for Public Enterprises in Developing Countries (ICPE)

57. ICPE is focusing its activities on investment-related technology policy and management. In the field of investment flows, transfer of technology and competitiveness, ICPE activities aim at development of "late-comer" strategies based on the proper balancing of foreign and domestic technological inputs, using the investment context as the dynamizing factor for optimal interaction. Concerning technology capability-building, ICPE's main ongoing projects are the management of technology in the framework of public enterprise adjustment and restructuring programmes in developing countries, inter-enterprise strategic partnership/alliances as a vehicle for transfer of technology and technological cooperation, and the management of foreign investment/collaboration arrangements as part of public enterprise restructuring/privatization programmes. ICPE believes that the sequence of building up local technological capabilities in developing countries should basically be along "reverse engineering" lines, and should develop the technology policy and management capabilities of the main implementers of the technological innovation process in developing countries. ICPE is strengthening cooperation among developing countries' consultancy and engineering organizations (CEDOs) to improve their access to the international consultancy/engineering services market.

(k) Islamic Development Bank (IsDB)

58. IsDB intervenes in different ways, in accordance with its commitment, to strengthen competitiveness and to support the building of national technological capabilities in its member countries. These operations include loan financing, equity participation, leasing, technical assistance and trade financing. IsDB endeavours to ensure that the relevant technology and know-how training is provided along with plant and equipment to beneficiary companies in its member countries, and that their personnel participate in the process of plant design, installation and operation. Other activities of IsDB include the financing of feasibility studies, detailed engineering design, supervision of project implementation, and training of personnel during project

preparation and implementation. The IsDB technical cooperation programme aims, inter alia, at enhancing the efficiency of projects financed by the Bank. IsDB also provides support to member countries in assimilating acquired technology, on-the-job training and the organization of seminars and workshops, as well as scholarship programmes for students to pursue their studies in scientific fields. Its Islamic Research and Training Institute is developing an Information System Network to provide direct support for scientific research, technological applications, and exchange of information. With respect to the transfer and development of environmentally sound technologies, IsDB recognizes the need to incorporate environmental factors in its financing, and has emphasized environmental conservation in its strategic planning. It finances pilot projects, such as biosaline agriculture, solid-waste management, biotechnology, date-palm research, a development network for the Near East and North Africa, and the promotion of environmental awareness and cooperation.

(l) Latin American Economic System (SELA)

59. The subject of technological development and industrialization has been defined in SELA's 1993-1994 Work Programme as one of the organization's priority areas. SELA carries out various activities related mostly to aspects of technology transfer and competitiveness. It performs sub-regional and regional coordination functions in the overall area of science and technology: for example, it organized a meeting of SELA organizations such as the Latin American Commission on Science and Technology (COLCYT), the Latin American Network of Technology Information (RITLA) and the Bolivar Programme on Regional Technological Integration, Innovation and Industrial Competitiveness. It is planning a coordination meeting in parallel with the XIX Ordinary Meeting of the Latin America Council in October 1993. SELA also carries out coordinating functions in the area of technological innovation, and is undertaking a biotechnology project with the EC, while continuing studies to promote new technologies at the regional level. The organization is planning the IV Regional Forum on Intellectual Property to promote the harmonization of positions on the subject. In this context, the secretariat is elaborating a technical cooperation programme among developing countries, based on a TCDC approach. In early 1994, SELA will hold the First Regional Forum on Industrial Policy to promote a dialogue on industrial and technology aspects of the transformation occurring in the region's productive sector.

(m) Organization for Economic Cooperation and Development (OECD)

60. Concerning investment flows, transfer of technology and competitiveness, the Directorate for Science, Technology and Industry carried out work on the impact of new technologies on investment and competitiveness, which was reflected in the 1992 OECD Science and Technology Outlook. These issues are further examined in the context of the preparation of the 1994 issue of the Outlook. In relation to the globalization of industrial activities, a study on the impact of foreign investment on domestic economies of OECD countries will be available in 1993 for discussion by the Industry Committee. The Directorate also prepared papers on the impact of national technology programmes and on generic technologies. Concerning policies for technology transfer among firms, institutes and universities, as well as technology transfer evaluation, studies were carried out on the former Czechoslovakia, Hungary, Iceland, Mexico, Portugal and Russia. In the case of Mexico, particular attention is being paid to human-resource aspects of technological development and transfer, as well as to the role of financial systems in technology-related investment with a view to improving competitiveness.

61. The Technology and Environment Programme, managed by the Environment Directorate, examined a number of cases in "clean technologies" trade. The evidence obtained led to the conclusion that trade-related policies and practices, including intellectual property rights, are not significant obstacles to trade in clean technology. Other obstacles were seen to be more important and also have an effect on the generation, transfer and diffusion of environmentally sound technologies. One such obstacle relates to a lack of appropriate environmental regulations in a number of countries. In the cases where clean technologies offered no cost advantage over existing or

traditional production technologies, industries had no incentive to import them if not forced to do so by new environmental standards. Another major obstacle is the lack of access to financing. Although stronger environmental regulations required firms to obtain cleaner technologies, they were unable to import them owing to insufficient funds or credit, even when the cleaner technologies offered lower operating costs and were economical in the long term. This problem was most acute in the high-debt countries of Latin America and Central and Eastern Europe. Therefore, the finding suggests that strengthening environmental standards alone in non-OECD countries will not be sufficient to encourage an expansion of trade in clean technologies. Focusing exclusively on trade policies in discussions of the transfer of environmentally sound technology may simply divert attention from what are considered by the participants in clean technology trade to be the real problems, thereby delaying development of effective solutions to these problems.

62. Concerning technology evaluation, the programme prepared a "Government Self-Assessment Guide" to promote development and implementation of clean technologies. Three OECD countries are currently pilot-testing this Guide, and a report will be issued in 1993. Concerning policies and measures to promote environmentally sound technologies, OECD has analyzed the relationship among industrial policy, pollution prevention approaches and environmental management in industry, and has worked out policy options.23/ In cooperation with UNEP (IE/PAC), a workshop was held in 1993 to involve developing countries in cleaner technology policy development. OECD also examined government financial support programmes (currently running at US$1.5 to US$2 billion per year) aimed at increasing the development of cleaner technologies. A workshop on this subject was held in 1993, and a report of the results will be issued later in the year.

(n) Preferential Trade Area for Eastern and Southern African States (PTA)

63. PTA is active in priority sector initiatives concerning investment-related technology issues in its member countries. With regard to technological capability-building, the PTA is currently establishing a Metallurgical Technology Centre (MTC) in Zimbabwe aimed at developing technologies for the utilization of local and imported raw materials in the metallurgical and allied industries. The Centre will also train personnel and provide consultancy services for the metallurgical industries. Institutions established in member States carrying out similar activities will be networked and coordinated by MTC. Another initiative, the Leather and Leather Products Institute established in Ethiopia, is carrying out R&D activities, consultancy services and training to improve the quality of hides and skins produced in the subregion. The Institute is also playing a leading role in the adaptation and development of technology. Another project of importance to agriculture aims at upgrading the techno-economic viability of seed dressing technology specifically tailored to the needs of the African small-scale rural farmers with a view to promoting its widespread utilization within the PTA region. Of importance to small and medium-scale enterprises in the PTA area is the organization of a technology market forum (TECHMART), to be held in August 1994 in Lusaka in cooperation with the Government of Zambia. In the field of telecommunications, PTA, in cooperation with other organizations and ITU, is supporting a project aimed at assessing the capability of African countries to manufacture telecommunications equipment with view to developing an integrated programme for their production. A computerized database on the telecommunications industry in Africa is to be established.

64. With respect to environmentally sound technologies, PTA attaches primary importance to environmental concerns in the design and implementation of all projects, in order to preserve the subregion's ecosystem and to arrest and reverse the effects of environmental degradation and industrial pollution.

C. National organizations

(a) Finnish Fund for Industrial Cooperation (FINNFUND)24/

65. With respect to investment and technology capability-building matters, FINNFUND, an independent public development finance corporation, promotes Finnish investment in Asia, Africa, Latin America, the Middle East and Central and Eastern Europe. Its financing facilities aim at encouraging the establishment of joint ventures with Finnish investment partners through the co-financing of feasibility studies and through other investment preparations, including assisting investors in choosing an appropriate technology. In the last five years, FINNFUND's portfolio, by sector, was distributed in the following way: 38 per cent chemical industries, 23 per cent metals and machinery, 12 per cent finance and planning, 8 per cent food and agro-business, 7 per cent construction materials, 5 per cent forestry management and 7 per cent others.

(b) German Agency for Technical Cooperation (GTZ)

66. The GTZ carries out technical cooperation activities commissioned by the German Government. The Agency's tasks include the planning, implementation and monitoring of programmes and projects, the extension of advisory services to other development institutions, the selection of experts, backing of field work, training and financial monitoring. Concerning technological capability-building, the German Appropriate Technology Exchange (GATE), a division of the GTZ, is a centre for the dissemination and promotion of appropriate technologies. It operates an Information and Advisory Service on Appropriate Technology (ISAT), which evaluates the efficiency of technologies on the basis of their development contribution and environmental impact. Cooperation on environmental technologies is concentrated in the areas of water, sewage, and energy technologies, and covers training in energy management and auditing, investment project evaluation and research into the improvement of energy efficiency in industry.

(c) International Development Research Centre (IDRC)

67. Through support for research, Canada's International Development Research Centre (IDRC), assists scientists in developing countries to identify long-term, workable solutions to pressing development problems. Support is given directly to scientists working in universities, private enterprises, government and non-profit organizations. Priority is given to research aimed at achieving equitable and sustainable development worldwide. Projects are designed to maximize the use of local resources, and to strengthen human and institutional capacity. IDRC is active in the fields of environment and natural resources, health sciences, information sciences and systems and social sciences. Particular emphasis is placed on six cross cutting environment and development themes: integrating environmental, social and economic policies; technology and the environment; food systems under stress; information and communication for environment and development; health and the environment; and biodiversity. IDRC is directed by an international Board of Governors and is funded by the Government of Canada.

(d) Swedish Agency for Research Cooperation with Developing Countries (SAREC)

68. SAREC has a long experience in the field of technology capability-building: It has contributed to the building up and strengthening of science and technology capacity in over 200 university departments and research institutes in 15 developing countries. Six of these countries are in Africa, three in Asia and six in Latin America. The main tools used by SAREC in its technological capability-building activities are the Regional and International Programmes and its Bilateral Research Cooperation Programme. The content of this Programme is determined by the relative strength of the scientific and technological capacity of the participating countries. In countries with a weak science and technology set-up, the main thrust is to strengthen the national research capacity, while in more developed countries the main objective is to generate research results of importance to the

country concerned, as well as to other developing countries. SAREC concentrates its research cooperation activities in scientific and technological areas where Sweden has advanced expertise to offer.25/

D. Non-governmental organizations

(a) International Association of Trading Organizations for a Developing World (ASTRO)

69. ASTRO was initially established as a cooperative institution of State-owned trading companies but is now open for membership to trading organizations of developing and developed countries as well as countries in transition. Concerning technology transfer, investment and competitiveness, ASTRO's basic objective is the promotion and facilitation of trade cooperation and development among its member organizations. Its work includes providing support services and information on trade and technology transfer arrangements to business enterprises. Responding to the demand from developing countries for these services, ASTRO member countries established the ASTRO Facilitation Centre for Industrial Offsets, Investments and Counter-trade (ASTRACO), which aims, inter alia, at identifying potential business partners for concluding industrial development transactions, and at designing and conducting training programmes at the national, regional and interregional levels. In the field of technology capability-building, ASTRO's Institute for Trade Management provides training in trade management and operations for personnel in trading organizations.

(b) International Federation of Consulting Engineers (FIDIC)

70. The FIDIC has not undertaken any recent work in investment-related technology issues, nor does it plan such work for 1994-1995. However, it has formulated specific policies on the transfer of technology and the promotion of environmentally sound technologies. FIDIC thus recommends the transfer of appropriate technologies in projects in the developing world. It attaches great importance to environmental issues, especially sustainable development, and expects consulting engineers to evaluate in all cases the environmental impact of projects and take appropriate action to mitigate any environmental problems.

(c) International Chamber of Commerce (ICC)

71. Concerning investment flows, transfer of technology and competitiveness, the promotion of international direct investment is one of the priority issues dealt with by the ICC. The Commission on Intellectual and Industrial Property has for many years been concerned with the problem of transfer of technology vis-à-vis its intellectual property aspects. Seminars on technology transfer have been regularly organized by the ICC, the latest on "Technology for Development" in 1992, and the next to be held in 1994 on "Technology Transfer in Eastern and Central Europe: Opportunities for International Business". In cooperation with its specialized division, the ICC World Industry Council for the Environment (WICE), the Commission on Intellectual and Industrial Property will focus on the emerging problem of transfer of environmentally sound technology.

72. The ICC Commission on Multinational Enterprises and International Investment has for many years given high priority to the promotion of private foreign direct investment, notably in developing countries. Recently it set up a high-level Working Party to look into the practical factors influencing the decision-making process of foreign potential investors, including the legal, administrative, financial and social infrastructures in host countries. The Working Party Report underlined the importance of a clear, stable legal system in the host country for attracting investment. As regards intellectual property rights, the absence of laws and non-adherence to the relevant international conventions in a potential host country was perceived as a major disincentive for foreign investors. The report also noted that certain conditions created by host countries for approval of foreign investment e.g., that certain transfers of technology be made from the foreign mother company, or that a fixed percentage of local revenue be used for R&D in the host

country, could result, inter alia, in higher costs, inadequate use of resources, and slower technological progress. It also emphasized the importance of education for growth, new investment and job creation and urged that special programmes be set up in conjunction with national and multinational enterprises, for vocational guidance and the development of skills to meet the needs of business and industry. In cooperation with the United Nations Centre on Transnational Cooperations, the ICC has published a manual, "Bilateral Investment Treaties 1959-1991", for policy makers, corporate executives and researchers concerned with foreign investment.

(d) International Organization for Standardization (ISO)

73. ISO activities in the area of investment-related technology issues are of a specific technical nature and concentrate on technological capability-building aspects. ISO contributes essentially to building up or improving national standardization infrastructures in each country, which are considered to be a central element in increasing countries' capacity to adapt, upgrade and create technology. This infrastructure should be closely linked to the corresponding activities at the international level to ensure that it follows current developments in other countries, thus helping to make an individual country's products compatible with the requirements of global markets.

74. The national standardization infrastructure consists of: (i) standards information services; (ii) testing facilities to assess the compatibility of new technologies and products with relevant technical regulations in force; (iii) certification infrastructures which facilitate access to export markets for products marketed by developing country industries; and (iv) quality improvement structures, such as internationally recognized standards for quality management systems (e.g., ISO 9000 series of standards) and quality training.

(e) Latin American Association of Development Financing Institutions (ALIDE)

75. ALIDE is active in the area of promotion of investment and business ventures. Its secretariat coordinates a Network of Projects and Investments through national focal points in Latin American and Caribbean countries, and has also set up a Service on Financial and Technological Information concerning Projects and Investments (SIFT). Its main objective is to provide specialized and systematized information to development, international and commercial banks, and to entrepreneurs, investors and promoters of investment projects in the Latin American and Caribbean region. The information provided is updated regularly and relates to statistics, technologies and investment opportunities.

(f) Technological Information Promotion System (TIPS)

76. The Technological Information Promotion System was founded in 1984 by the United Nations Development Programme (UNDP) within the framework of South-South cooperation implemented by DEVNET, which is becoming an international non-governmental organization. It provides for a daily exchange of information on scientific, technological and business opportunities among developing countries. In the fields of technology transfer and technology capability-building, TIPS has established itself as a functional technological and trade information network covering 14 sectors of activity, such as agro-industry, biotechnology, chemicals, mining, energy and packaging. It now possesses a very comprehensive database on supply and demand in the countries of the South, and it continues to expand rapidly. National bureaux have been created in various Central and South American countries as well as in the Middle East, Asia and Africa. The Spanish Editing desk has been established in Caracas (Venezuela) and the English desk is operating in Manila (Philippines). The general objectives of TIPS for the near future are the institutional, operational and economic consolidation of the system, and its geographical expansion.

(g) World Assembly of Small and Medium Enterprises (WASME)

77. WASME, with members and associates in 75 industrialized and developing countries, is a non-governmental organization actively engaged in the creation of an environment allowing a more dynamic growth of small and medium sized enterprises, particularly in developing countries. WASME acts as a clearing-house for information relating to these enterprises with respect to legislation, policies, projects, programmes and various schemes, in particular through its monthly "Newsletter". Activities specifically involving investment-related technology issues include the promotion of enterprise-to-enterprise cooperation in technology transfer and skill development, the updating of a roster of experts/consultants, the establishment of a Technology Promotion and Exchange Centre at WASME headquarters, and the organization or sponsoring of consultations, seminars, workshops and conferences.

Notes

1/ "Cartagena Commitment" (TD/364).

2/ "Report of the Ad Hoc Working Group on the Interrelationship between Investment and Technology Transfer on its first session" (TD/B/39(2)/18 TD/B/WG.5/4).

3/ Ibid, annex 1, para. 7. (b).

4/ Two of these organizations (the World Intellectual Property Organization and the Conference on Security and Cooperation in Europe) wrote to state that they were not involved in specific activities on investment-related technology issues.

5/ The DESD was created on 1 March 1992 to consolidate the functions and mandates of, inter alia, the United Nations Centre on Transnational Corporations and the Centre for Science and Technology for Development, and operated on that basis until 1993. Part of these functions are now integrated into UNCTAD.

6/ Recent publications in this domain include: "Third World transnational corporations and their impact on home developing countries" (ST/CTC/133); "The Impact of Trade-related Investment Measures on Trade and Development" (Joint publication with UNCTAD, E.91.II.A.19); "Government Policies and Foreign Direct Investment" (E.91.II.A.20); "From the Common Market to EC 1992 - Regional Economic Integration in the European Community and Transnational Corporations" (E.93.II.A.2).

7/ "Environmentally Sound Technology for Sustainable Development" (ST/STD/ATAS/7).

8/ "Report of the Secretary-General on the assessment of the effect of activities of the United Nations system related to the process of creating and strengthening endogenous capacity-building in science and technology in developing countries" E/CN.16/1993/4.

9/ E/C.7/1993/9 of 1 March 1993; and E/C.7/1993/12 of 24 February 1993.

10/ For recent documents issued in this field, see: "Le rôle des sociétés transnationales dans le développement de l'informatique en Afrique" (E/ECA/UNCTC/63); "Développement du système informatisé sur les données financières en Côte d'Ivoire" (E/ECA/UNCTC/73); "Les techniques de negotiation en matière de transfert de technologie: les contrats de licence dans les entreprises africaines" (E/ECA/UNCTC/56); "Le transfert de technologie dans les industries pétro-chimiques en Afrique du Nord: le cas de l'Algérie" (E/ECA/UNCTC/61); "Le transfert de technologie dans le secteur africain de l'alimentation: étude préliminaire" (E/ECA/UNCTC/50); "Le transfert de technologie dans les industries agro-alimentaires en Afrique Centrale: le cas de l'industrie du sucre du Congo" (E/ECA/UNCTC/55); "Transfer and development of new technologies in Africa- Case on Renewable Energies in Burundi" (E/ECA/UNCTC/83); "The Role of TNCs in the Transfer of Bio-technology in Africa: Case study of Tanzania" (E/ECA/UNCTC/87 and E/ECA/UNCTC/78).

11/ Among the most recent documents published, see: TRADE/R.588 of 9 November 1992; and TRADE/WP.5/R.9/Rev.1 of 25 November 1992.

12/ Recently ECLAC published, inter alia: in 1991: "Industrial Modernization in Mexico" (LC/L.613); "Perspectivas del comportamiento tecnológico de las empresas nacionales y transnacionales en la industria del Brasil" (LC/R.1050); "Empresas transnacionales y restructuración industrial en Colombia" (LC/R.1052); "Cooperación industrial entre países desarrollados y en desarrollo: un estudio de caso en Chile" (LC/R:1054); "El papel de las empresas transnacionales en la restructuración industrial de Colombia: una síntesis" (LC/R.1055). In 1992, it published, among others: "Capital

extranjero en el sector industrial: caso peruano" (LC/R.1053); "Análisis de la encuesta sobre empresas con inversión extranjera directa en la industria colombiana" (Documento de Sala de Conferencia, DSC/3); "Latin America's Experience with Technology Policies: Current Situation and Prospects" (prepared by the International Workshop on Systems of Innovation, organized for CNRS-LATAPSES - Bologna University); in 1993: "A New International Industrial Order" (LC/R.1268); "Transnational Corporations and the Manufacturing Sector in Brazil" (LC/R.1261); "Transnational Corporations and Industrial Modernization in Brazil" (LC/R:1260).

13/ Recent advanced UNDP pipeline projects include, for example, in Latin America, projects on boosting science and literacy in elementary and high school education; strategic science and technology key decision-making practices; transfer of technology in specific products, such as for spice and cognate native products; exploration of possible new types of technology-driven business; in Africa: technology for small mining operations, technology commercialization in the food processing sector, namely coffee processing; multi-disciplinary natural resources exploitation; cooperation among universities, e.g., in the field of telecommunications; in countries in transition to market economy: projects on plant reorganization and new options; programmes for optimal utilization of medical technology; in Asia: bio-preservation; new materials production; post-harvest organization.

14/ "The World Environment 1972-1992", published in December 1992 was a major UNEP report which outlined the major environmental trends and issues over the past 20 years. The Governing Council, which commissioned the report, believes that it is an important benchmark for action on sustainable development and, at its 17th session, agreed to provide another world environment report 10 years hence.

15/ Some recent ILO publications dealing with investment-related technology issues include the following - Books/monographs: Iftikhar Ahmed (ed.) "Biotechnology: A Hope or a Threat?", foreword by Micheal P. Lipton (London, Macmillan, 1992); Susumu Watanabe (ed.) "Microelectronics and Third World industries" (London, Macmillan, 1993); D.J.C Forsyth "Technology policy in small developing countries" (London, Macmillan, 1990); J.L Enos "The creation of technological capability in developing countries" (London, Pinter, 1991); Carlos Maldonado and S.V. Sethuraman (eds.) "Technological capability in the informal sectors of developing countries" (Geneva, ILO, 1992); A.S Bhalla (ed) "Environment, employment and Development (Geneva, ILO, 1992). ILO World Employment Programme Working Papers: Jeffrey James "New technologies, poverty and employment: The future outlook" WEP 2-22/WP.230, Geneva, ILO, May 1992; Massoud Karshenas "Environment, employment and sustainable development" WEP 2-22/WP.237, Geneva, ILO, December 1992; Theodore Panayotou "Empirical tests and policy analysis of environmental degradation at different stages of economic development" WEP 2-22/WP.238, Geneva, ILO, January 1993.

16/ Selected recent publications from the WHO include the following: "Technical Cooperation among Developing Countries in Support of Health for All: Implementation of Resolution WHA43.9: Report by the Director-General" (EB89/21); "Intensified WHO Cooperation with Countries and Peoples in Greatest Need: Report by the Director-General" (A46/INF.DOC/2).

17/ Information on the activities of the CTCS are provided in the annual reports of the "Caribbean Technological Consultancy Services Network".

18/ See: "Notes on EC Scientific and Technical Cooperation with Third World Countries"; Commission Staff Working Paper on "Transfer of Technology" for the First Substantive Session of the Commission on Sustainable Development; "Note descriptive des activités de la Communauté dans le domaine de la promotion des investissements dans les Etats ACP"; ECIP - "European Community Investment Partners" (information leaflet).

19/ The current Third Framework Programme (1990-1994) distributes a budget of ECU 5,700 million to companies in the industrial sector, universities, and private and public research institutes, largely for research on technology-related activities. Information and communications technology and industrial and materials technology are the most important areas of the Framework Programmes. These activities are backed by programmes outside the Framework, in particular SPRINT, a support programme for innovation and technology transfer, STAR and VALOREN, programmes for the development of regional infrastructures in telecommunication and energy, as well as a number of other programmes aimed at developing databases and information systems.

20/ This contribution is based on the following material made available to the Secretariat: "The Ecoregional Approach to Research in the CGIAR" Report of the TAC/Center Directors Working Group (March 1993); CGIAR 1992 Financial Report.

21/ The following contribution is based upon EIB annual reports (1990, 1991, 1992) made available to the secretariat.

22/ Within this context, the Instituto Superior de Economia e Gestâo of Portugal has recently published a document entitled "The Eureka Program and the Bolivar Program: A new model for international cooperation in technology" (Centro de Estudios y Documentacion Europea, 1992).

23/ See: "Trade Issues in the Transfer of Clean Technologies", OECD, Paris, OECD/GD(92)93 (1992); "Government Policy Options to Encourage Cleaner Production and Products in the 1990s" OECD/GD(92)127 (1992).

24/ This contribution is based on FINNFUND's Annual Report 1992, made available to the secretariat.

25/ See: SAREC annual reports 1990/91, 1991/92; "The SAREC model: Institutional cooperation and the strengthening of national research capacity in developing countries" (M. R. Bhagavan).